

# Human factor in Airplane Accidents

## Cadets Say Fliers, Not German Agents, Are Re- sponsible for Most Falls

**T**HE officers and cadets of the flying fields that are scattered thickly over Texas do not share the belief of Senator Overman and a good many others that Teuton agents in airplane plants are responsible for any of the deaths by accident among them. They say they do not know anything about conditions in airplane factories and therefore do not know whether or not his assertions about the number of Germans employed therein are true, but they are skeptical about the senator's fears and allegations. They think they know a good deal about the causes of the many accidents, both fatal and non-fatal, that have occurred during the last six months, says a writer in the New York Times' magazine section. And they declare very positively that not one of these accidents has been due to faulty construction or to enemy tampering with the machinery. They say that in every case, thus far, the cause for the accident was to be found in the man himself and not in the machine he was driving.

Among the flyers the conviction is strong that even if the machinery of an airplane were to be weakened by the method indicated by Senator Overman it would probably be discovered in the course of the rigorous examination and tests to which it is subjected before it is sent from the factory. Still, they admit that a machine so damaged might possibly slip through without discovery. But they do not believe that, up to the present time, any such damaged machine has been sent to an American flying field.

And as for the possibility of a German agent doing any "monkey business" with an airplane after it is received by a flying field, they scoff without mercy at the mere suggestion. They do not deny the possibility of spies being present on any or all the flying fields but they do not believe that the most astute and malignant German agent could "put anything over" in the hangars which house their steeds of the air.

In charge of each hangar is an officer whose duty it is to know all about each machine in it, what happens to each one, where it is at any moment, and what its condition is whenever it is in the hangar. Three mechanics are detailed to each machine to keep it in order and groomed for use whenever it may be needed. The flying men are confident that no sabotage could be successfully attempted under these conditions except by means of an organization so large and so unlikely in flying field forces that its possibility is not worth considering. In addition, no man ever takes a plane up from a flying field without himself first carefully inspecting its machinery. The aviators are so confident that the fault does not lie in the planes that when they are discussing the cause of accidents they do not even mention the planes or their machinery, unless they are questioned by an outsider. They confine their discussions to the human factor involved and speculate upon why his nerves or his muscles, his heart or his brain, failed him at some crucial moment.

The percentage of losses among student aviators is much larger at Canadian than at the American training schools, while the number of fatal accidents at the Canadian field at Fort Worth, Tex., is appalling. That field has suffered more casualties than all the other fields together in Texas. The aviators of the American fields are all of the opinion that the fatalities there are mainly due to haste and carelessness in training.

At the American fields a man must have had from four to nine hours of training in the air with an instructor, the time depending on his quickness in learning control, before he is allowed to take up a machine by himself.

A "tail spin," one of the causes of accidents most commonly cited, is an acrobatic stunt which an aviator must know how to execute with skill and ease. In it he noses his machine downward with its tail whirling in a circle above him, while its nose whirles in a similar but smaller circle beneath him, and he, in the pilot's seat, is the pivot of the two gyrations. To the landsman it sounds a heady sort of a combination, and it is likely to prove so to the aviator unless he has the knowledge and the skill with which to manage it. To throw his machine in and out of tail spins is a part of his daily practice after he begins the acrobatic training, and in a very little while he acquires sufficient knowledge of what to do and instinctive control of the machinery to execute tail spins as easily and safely as he could twist on his toes or turn on his heel if his feet were on solid ground.

But he may get into a tail spin accidentally in his early flights alone and, although he may know what is the right thing to do to take the machine out of it, he may lose his head at the critical moment and fail to do what he ought. Every man, woman, or child who has learned to ride a bicycle or drive an automobile is familiar with that unconscious influence of the mind over the muscles which causes one who has not yet acquired complete command of a machine to drive straight at the object which he wishes and is doing his best to avoid. The aviator has a brief time in his training when he suffers from that same difficulty and at important moments is prone to give the wrong pressure upon his control stick or his elevator. If he does this when his machine goes into a tail spin and his mind does not work quickly enough to recognize his difficulty and do the right thing, a fatal accident is very likely to result.

Dizziness, sudden panic, failure to think quickly, unconscious movement, ignorance of what to do, may cause a fatal accident when a learner



gets into a tail spin accidentally. Or he may intentionally take his machine into one, before he has had the usual instruction, out of the spirit of adventure, or even the childish desire to convince himself of his daring or exhibit it to his fellow students. But, whatever the cause, it is the opinion of flying field aviators that getting into a tail spin, purposely or accidentally, without being able to manage it properly, is the cause of a large proportion of fatal accidents at the flying fields.

The same perverse, unconscious influence of the mind over the muscles which forces the bicycle learner straight toward the object he is trying to avoid is responsible for many of the fatal accidents due to collisions. Even the most expert of flyers may be unable to avert a serious accident when he sees approaching him a plane driven by a cadet who is doing his level best to keep his machine out of the other's way. How serious and ever-present is this danger in flying fields is proved by Capt. Vernon Castle's death.

In flying there are certain "blind angles" in which collisions are possible through no fault of the driver of either plane. The sections of space covered by the wings of his ship are invisible to the pilot, and if such a section coincides with the space concealed from the eyes of another pilot approaching from below or at one side, a sudden crash is likely to be the first that either knows of the other plane. This "blind angle" may be the cause of an occasional serious accident, but aviators do not think that such collisions are of frequent occurrence.

Engine trouble causes many unimportant accidents, but, aviators say, should never offer any serious difficulty to a man who has learned how to manage his plane, if he is in a region where it is possible for him to come down safely. And for engine trouble there are as many possible and legitimate causes as there are reasons for an automobile to balk.

In a few cases a broken propeller has caused a pilot to make a forced landing, with injury to his plane, but, up to the present time, never with serious result to himself. The accompanying picture shows what happened to a pilot when his propeller weakened, cracked and broke over the grounds of a high school in the environs of Houston, Tex. He brought his ship down with some damage to it, but none to himself, and greatly to the delight of the inhabitants of the region.

Various causes may result in the breaking of the propeller. It may have been injured in some previous nose dive to the ground; or a bird may have got entangled in its blades. Cadets are forbidden to chase birds because of the possibility of such a result and the sure smashing of the propeller. Nevertheless, they do it sometimes, when the instinct of the chase is strong in their blood. And it would be quite possible for a bird to fly against his propeller, to the undoing of both bird and propeller, and the pilot to be ignorant of what had happened.

The men who by hard work and steady practice have earned the right to the title of "bird-men" believe that with both students and skilled aviators one cause of fatal accidents is the failure of the nervous system to respond immediately and accurately to the command of the brain. Anything which causes nervous fatigue may bring about that physical state—disorientation, nerve strain, physical weariness, lack of sleep. The flyer must be so alert, his grasp upon every situation which may confront him so instant, and his action to meet and control it so prompt that the fraction of a second in the movement of his hand upon the controls of his machine may mean the difference between life and death.

And anything which slows by even so little the action of the brain in an emergency, or the flashing of its commands along the nerves, or the instant obedience of the motor nerves may send him crashing to the earth. The cadets before they have become what they call "instinctive flyers" are especially liable to this danger, although even those who are skilled in the air are not free from its menace. Birdmen who are skilled in one, or another, or several forms of athletics say that in nothing else have they felt so much the necessity of this instant and complete response of the nerves to the demand upon them.

The cadets quickly discover, so they say, that lack of plenty of sleep soon results in a physical

condition which, although they would not even notice it in any other occupation, they regard as dangerous in flying. In one of the Texas fields recently a lieutenant with a reputation as a skilled and careful aviator fell from a considerable height and was killed instantly. His nearest friends were unanimous in the belief that his fall was due to the fact that he had not been getting enough sleep. For a week he had been giving instruction in night flying, working all night, and had not been able to sleep well during the day.

Careful training and plenty of practice soon bring the student aviator to the point where flying becomes as instinctive with him, in the movement of hand and foot upon the controls of his machine, as the action of his body in walking. For him flying becomes as safe as running an automobile is for the skilled motorist.

So far as the machine and his control of it and the medium through which or upon which he moves are concerned. But the unreliability of the human mechanism must still be reckoned with, and that unreliability seems to be greater in the air than it is upon the ground. It sometimes results in strange and unexpected happenings.

Once in a while a man in the best of health and the pink of condition, who has passed with high success every one of the severe tests to which aviation candidates are subjected, who has never fainted before in his life, will faint while he is in the air. One recent fatal accident at a Texas field is supposed to have been due to that cause.

One pilot fainted and the plane fell to the earth, but neither he nor the student with him was hurt except for a few scratches and cuts. He said that he did not know why he fainted. All that he knew was that he suddenly lost consciousness, and did not regain it until he was being hauled out of the wrecked airplane. He had never fainted before in his life.

Neither had another young fellow, to whom everything suddenly became a blank as his machine was sailing away through the blue. It was still sailing along easily when presently he came to himself again with the feeling that something had happened to him. Looking down, he could see that he had covered a considerable distance since the moment when he had lost consciousness. He does not know why he fainted any more than he knows why he did not spin downward to probable death during those blank moments.

A British surgeon attached to the relay naval air service, Dr. H. Graeme Anderson, who has had extensive experience at British flying stations, has recently written some interesting conclusions concerning these somewhat obscure causes of airplane accidents at training schools.

In the opinion of Doctor Anderson, based upon study and comparison of the statements made to him in such cases by a hundred student flyers, there is a brain fatigue not due to previous mental or physical strain that may yet cause serious accidents. He thinks it is induced by the impact of overwhelming sensations upon the mind of the pupil after he is in the air. The flying pupil who is overcome by this form of fatigue, says Doctor Anderson, "reaches the stage where he has the power neither to reason, decide, nor act. A state of mental inertia supervenes. This is due to repeated stimuli received by his brain in rapid succession in his flight. He feels alone; a succession of errors occurs in the air; he feels he cannot manage to control the airplane; fear does not seize him, but the enormity of the whole thing appalls him; he feels helpless, and a state of brain fatigue occurs in which he, in a stupor, awaits events and takes little part in the airplane's control."

This form of brain fatigue would seem to be largely a result of personal temperament. Doctor Anderson thinks it responsible for "a fair proportion of accidents" among students in the early stages of flying, and he adds that student aviators who have suffered from it, if they escape injury, are likely to give up flying.

There are many, many of the unimportant accidents, of which nobody takes heed. But of fatal accidents, notwithstanding the concern over them manifest in some parts of the country, the percentage is no greater than should be expected, less than in the flying schools of some other countries, and is not higher than it is in almost any extra-hazardous occupation. And when it is remembered that this latter comparison brings together figures representing men in the training stage with those of skilled workers, it is evident both that flying is a safer game than it has the credit of being, and that it will be a good plan for the country to guard against hysteria over the fatalities that do occur.

### BUSINESS OPPORTUNITY.

"Baths are scarce in Europe. Frequently you have to order a tub sent in."  
"Is that so?"  
"Yes, and it takes time."  
"Um. A fellow might do a good business going around with one of these motorcycles with bathtub attached."—Louisville Courier-Journal.

### ONLY ONE LASTING CONTRACT

Nuptial Agreement Must Be Written in Hearts and Temperament of Contracting Couple.

A Western couple, each of whom had been married twice before and twice divorced, have sought to insure the success of their third venture by a detailed written contract. It is surely one of the most extraordinary prenuptial agreements ever made. Remembering the rocks upon which their various matrimonial ships have been wrecked before, they have carefully charted them and mapped out the course around them. The contract specifically sets forth which one shall build the fires, when the husband may bring guests home to meals, when the relatives of each shall visit them, and how the spending of money is to be divided, how often the wife may attend clubs and social functions.

Thus they have arranged, they think, for every possible contingency that may arise in the wedded life of two persons.

Maybe they will find it so. But it takes no pessimistic spirit to suspect that such a contract contains either too much or too little.

The possible trouble of a married couple may be provided against by contract. But it must be a contract not of paper and writing, but of the heart and the temperament.

If the hearts be right, all the possible troubles of the pair may be summed up in a few words. But if these be not right, no possible combination of all the words in the dictionary can even indicate the possible troubles.

The marriage contract that means the most need say the least. "To love and cherish one another"—here is a contract that covers more ground than can definitely be expressed in all the words in the language.

If that will not hold good under all contingencies, no other contract will. —Christian Herald.

### Diamonds for Slackers.

Buying diamonds is the latest way to dodge the income tax. It is said by some of the dealers in white stones that many of our newly rich munition makers have been salting away diamonds, and they admit that they haven't seen such prosperous times since the famous Kohinoor was a dew-drop. This flush of diamond buying indicates the latest word in "ingenuity" on the part of the possessors of the diamond price. And here is the answer: Investments in diamonds are not reckoned in the tally of sources of income. That's one of the things the framers of the income law tax overlooked. Bonds, yes; automobiles, yes; first and second mortgages, two yeses in the same place. But the money spent in collecting sparklers does not have to be accounted for in the tabulation of taxable values. Diamond money is easily convertible at any time, and it may even yield dividends on the upward trend of the diamond mart.

### Grease From Garbage.

The food administration's figures show the estimated grease production from garbage in the 29 cities investigated to be 72,000,000 pounds, or enough to produce 10,000,000 pounds of nitroglycerin, enough for the powder charge of 18,000,000 American three-inch shells or French 75-millimeter shells, and fatty acids in a sufficient quantity to manufacture about 200,000,000 cakes of soap, weighing 12 ounces each.

It is further shown that the estimated fertilizer tonnage produced in the 29 cities amounts to 150,000 tons, which contains about 9,000,000 pounds of nitrogen, 22,000,000 pounds of phosphate of lime and 2,900,000 pounds of potash. These chemicals are sufficient to replace the nitrogen and other elements taken from the soil by 3,000,000 bushels of wheat. The estimated present value of these quantities of grease and tankage, recovered from garbage, is placed at \$11,100,000.

### An Editor's Dilemma.

The editor of the Hartford Courant has added to his burden of cares by starting to worry over the question of dress. Man, he contends, wears too much, and calls upon some inventive genius to simplify masculine garb in order to save money and also time spent in juggling buttons.

Taking an inventory of himself, the editor discovered that before going downtown he must put on one undershirt, two socks, two sock supporters, one shirt, a pair of trousers, a pair of suspenders or belt, two shoes, a collar, a necktie, a vest, a coat and a hat—15 separate articles.

A poet chap once wrote that "man was made to mourn," but in specifying reasons for it he failed to mention the troubles now so lucidly set forth by our Connecticut contemporary.—Philadelphia Telegraph.

### Considered Bandits Nuisances.

For kindness and generosity to hold-up men deliver the hand-embossed leather medal to Albert Belanger, Chicago grocer.

A "tall, dark man," according to Belanger's report to the police, entered his store and started tickling his ribs with a revolver.

"Here, you can't pull that stuff in here," Belanger told the bandit as he seized the gun. "Get out."

The bandit "got" and Belanger tossed his weapon after him into the street.

"Now take this and beat it," the grocer enjoined, and the burglar did. "These fellows are getting to be nuisances," was Belanger's comment as a customer drifted in.

# GOOD ROADS

## TRACTOR AIDS ROAD MAKING

Successfully Used in New Hampshire in Conjunction With Regulation Road Machine.

In Atkinson, N. H., the farm tractor has been successfully used in making and preparing roads, doing away with horses.

A 20-horse-power tractor, as shown in the picture, was used in conjunction with the regulation road machine for rounding off the surface of the road and cleaning out gutters. It was found that the tractor not only easily does the work of six or eight horses, but better and in less time. Two men only are required as compared with four required with the former system. Besides, double the ground is covered.

When the tractor is used with the road drag, one man, driving the tractor, can round up as much as one man with a pair of horses in one day and a half. The tractor hauls four to six



Efficient Aid in Road Repairing.

cartloads of gravel in the same time that a two-horse team requires for one load. Figured in dollars and cents, the tractor could easily do \$24 worth of work at a cost of only \$5, with an additional saving of from 25 to 50 per cent in time.—Popular Science Monthly.

## RIGHT SYSTEM OF HIGHWAYS

It Should Include Everything From Expensive Concrete to Minor Dirt Wagon Ways.

What we need and in time will have is a system of highways which will ramify from the largest cities to the doorway of the humblest citizen—villager or farmer. Such a system of highways will include trunk lines with expensive concrete or brick surfaces for the very heavy traffic, including trucks and automobiles. Less used but important roads may be of waterbound macadam or gravel. Perhaps in certain regions where stone and gravel are not at hand oiled roads may prove most economical and practical. Minor wagon ways must remain of native soil, built and maintained with the road drag. Meanwhile antagonism to road dragging breeds in a lack of information or a narrowness which fails to comprehend the facts.—D. Ward King.

## BENEFIT OF IMPROVED ROADS

Make It Possible to Consolidate and Establish Graded Schools in Rural Districts.

(Prepared by the United States Department of Agriculture.)

That improved roads would benefit our country-school system there would seem to be no doubt. Good roads make it possible to consolidate or centralize the schools and to establish graded schools in the rural districts. Such schools centrally located will accommodate all of the children within a radius of four or five miles. In many communities having the advantage of improved roads commodious buildings have been provided, more competent teachers employed, and modern facilities for teaching supplied at a minimum cost.

## EXPERIMENTS TO BE TRIED

Temporary Improvement of Sand Roads to Be Made by Use of Straw, Hay or Wire Grass.

For the first time an experiment in temporary improvement of deep sand roads by use of a carpet of straw, hay, or wire grass, sprinkled with tar or bituminous produce, will be tried on Wisconsin highways in the vicinity of Rice, Columbia county. It is hoped to devise methods which will fit the road for travel at small expense, and it is predicted that this straw carpet will last three years where traffic is not heavy. Other experiments in resurfacing highways are to be tried on the Baraboo-Kilbourn road. Thirty-four hundred sections have been staked out, and treatment of each will be different.

### Road Posts in Ohio.

Main roads and cross roads in Ohio will be marked with cast iron posts carrying enameled signs. The designs for these posts have been approved. County commissioners will be asked to send a list of all the signs needed in their country.

### Still Want Good Roads.

The day when the airplane shall succeed the automobile as a means of locomotion probably will find many communities still talking about building hard surface roads.